

## THE CLAIMS

### What is claimed is:

- 5    1.    A vaporizer comprising:
  - a thermally conductive block having a multiplicity of non-moving elongated wells formed therein for placement of a vapor source material, the multiplicity of elongated wells communicatively connected to an interior space within the thermally conductive block for accumulation of vapor;
  - 10        means for applying heat to the multiplicity of the elongated wells within the thermally conductive block;
  - means for sealing the thermally conductive block; and
  - an outlet for discharge of vapor formed in the vaporizer.
- 15    2.    The vaporizer of claim 1 further comprising a control mechanism for controlling temperature generated by the means for applying heat.
3.    The vaporizer of claim 1 containing liquid source material.
- 20    4.    The vaporizer of claim 1 containing solid source material.
5.    The vaporizer of claim 1 containing decaborane
6.    The vaporizer of claim 1 wherein at least four elongated wells are formed in the
   
25        thermally conductive block.
7.    The vaporizer of claim 1 wherein the means for applying heat to the thermally conductive block comprise at least one resistive heating element.

8. The vaporizer of claim 1 wherein each wall of the thermally conductive block has at least one resistive heating element attached thereto.
9. The vaporizer of claim 1 wherein the means for controlling temperature comprise a thermocouple.
10. The vaporizer of claim 6 wherein the means for controlling temperature are arranged to maintain the block at a sufficient temperature to vaporize the source material.
11. The vaporizer of claim 1 wherein the thermally conductive block is fabricated of aluminum or an aluminum alloy.
12. The vaporizer of claim 6 wherein the thermally conductive block has an interior volume of about 160 cm<sup>3</sup>.
13. The vaporizer of claim 12 wherein the multiplicity of elongated wells constitute an interior volume of about 60 cm<sup>3</sup>.
14. The vaporizer of claim 1 wherein the thermally conductive block is uniformly heated, thereby reducing cold spots within the elongated wells and interior space.
15. A method for vaporizing a source material comprising the steps of:
  - introducing a source material into a multiplicity of elongated wells formed in a thermally conductive block, the multiplicity of elongated wells communicatively connected to an interior space within the thermally conductive block for accumulation of vaporized source material ;
  - sealing the thermally conductive block to form a vacuum in the multiplicity of wells and interior space;

applying heat to the thermally conductive block to simultaneously heat the elongated wells and vaporize source material therein to form source material vapor; and

delivering source material vapor to a deposition system.

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16 The method of claim 15 wherein the deposition system comprises a process unit selected from the group consisting of ion implantation units, chemical vapor deposition units, and metal organic chemical vapor deposition units.

10 17. The method of claim 15 further comprising controlling temperature generated by the step of applying heat.

18. The method of claim 15 wherein the source material is a liquid or a solid.

15 19. The method of claim 15 wherein the source material comprises decaborane.

20. The method of claim 15 wherein at least four elongated wells are formed within the thermally conductive block.

20 21. The method of claim 15 wherein the step of applying heat comprises resistively heating the thermally conductive block.

22. The method of claim 15 wherein temperature within the thermally conductive block is maintained at a sufficient temperature to vaporize the source material.

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23. The method of claim 15 wherein the thermally conductive block is fabricated of aluminum or aluminum alloy.

24. The method of claim 15 wherein the thermally conductive block is uniformly heated, thereby reducing cold spots within the elongated wells and interior space.

25. A vaporizing and deposition system comprising

5 a vaporizer comprising: a thermally conductive block having a multiplicity of stationary elongated wells formed therein for placement of a vapor source material, the multiplicity of elongated wells communicatively connected to an interior space within the thermally conductive block for accumulation of vapor;

10 means for applying heat to the thermally conductive block to vaporize the source material;

means for sealing the thermally conductive block;

an outlet for discharging vaporized source material from the vaporizer;

and

15 a deposition system joined in vapor flow communication with the outlet.

26. The system of claim 25 wherein the source material directly contacts interior surfaces of elongated wells.

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